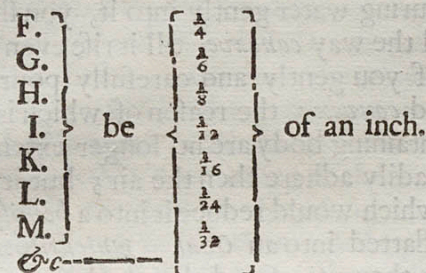


round Spring (the way of making which trials is obvious enough.) And with the fluid bodies of *Mercury, Air, &c.* the way of trying which, will be somewhat more difficult; and therefore I shall in brief describe it. He therefore that would try with *Air*, must first be provided of a *Glass-pipe*, made of the shape of that in the *fifth Figure*, whereof the side *A B*, represents a straight *Tube* of about three foot long, *C*, represents another part of it, which consists of a round *Bubble*; so ordered, that there is left a passage or hole at the top, into which may be fastened with cement several small Pipes of determinate cylindrical cavities: as let the hollow of



There may be added as many more, as the Experimenter shall think fit, with holes continually decreasing by known quantities, so far as his senses are able to help him; I say, so far, because there may be made Pipes so small that it will be impossible to perceive the perforation with ones naked eye, though by the help of a *Microscope*, it may easily enough be perceived: Nay, I have made a *Pipe* perforated from end to end, so small, that with my naked eye I could very hardly see the body of it, insomuch that I have been able to knit it up into a knot without breaking: And more accurately examining one with my *Microscope*, I found it not so big as a sixteenth part of one of the smaller hairs of my head which was of the smaller and finer sort of hair, so that sixteen of these Pipes bound faggot-wise together, would but have equalized one single hair; how small therefore must its perforation be? It appearing to me through the *Microscope* to be a proportionably thick-sided *Pipe*.

To proceed then, for the trial of the Experiment, the Experimenter must place the *Tube A B*, perpendicular, and fill the *Pipe F* (cemented into the hole *E*) with water, but leave the bubble *C* full of *Air*, and then gently pouring in water into the *Pipe A B*, he must observe diligently how high the water will rise in it before it protrude the bubble of *Air C*, through the narrow passage of *F*, and denote exactly the height of the *Cylinder* of water, then cementing in a second *Pipe* as *G*, and filling it with water; he may proceed as with the former, denoting likewise the height of the *Cylinder* of water, able to protrude the bubble *C* through the passage of *G*, the like may he do with the next *Pipe*, and the next, &c. as far as he is able: then comparing the several heights of the *Cylinders*, with the several holes through which each *Cylinder* did force the *air* (having due regard to the *Cylinders* of water in the small *Tubes*) it will be very easie to determine, what force is requisite to press the *Air* into such and such a hole, or (to apply it to our present experiment) how

how much of the pressure of the *Air* is taken off by its ingress into smaller and smaller holes. From the application of which to the entering of the *Air* into the bigger hole of the *Vessel*, and into the smaller hole of the *Pipe*, we shall clearly find, that there is a greater pressure of the *air* upon the water in the *Vessel* or greater *pipe*, then there is upon that in the lesser *pipe*: For since the pressure of the *air* every way is found to be equal, that is, as much as is able to press up and sustain a *Cylinder* of *Quicksilver* of two foot and a half high, or thereabouts; And since of this pressure so many more degrees are required to force the *Air* into a smaller then into a greater hole that is full of a more congruous fluid. And lastly, since those degrees that are requisite to press it in, are thereby taken off from the *Air* within, and the *Air* within left with so many degrees of pressure less then the *Air* without; it will follow, that the *Air* in the less *Tube* or *pipe*, will have less pressure against the superficies of the *water* therein, then the *Air* in the bigger: which was the minor Proposition to be proved.

The Conclusion therefore will necessarily follow, viz. That this unequal pressure of the *Air* caused by its ingress into unequal holes, is a cause sufficient to produce this effect, without the help of any other concurrent; and therefore is probably the principal (if not the only) cause of these Phenomena.

This therefore being thus explained, there will be divers Phenomena explicable thereby, as, the rising of *Liquors* in a *Filtre*, the rising of *Spirit of Wine, Oyl, melted Tallow, &c.* in the *Week* of a *Lamp*, (though made of small *Wire, Threds of Asbestos, Strings of Glass*, or the like) the rising of *Liquors* in a *Spunge*, piece of *Bread, Sand, &c.* perhaps also the ascending of the *Sap* in *Trees and Plants*, through their small, and some of them imperceptible pores, (of which I have said more, on another occasion) at least the passing of it out of the earth into their roots. And indeed upon the consideration of this Principle, multitudes of other uses of it occur'd to me, which I have not yet so well examined and digested as to propound for *Axioms*, but only as *Queries* and *Conjectures* which may serve as hints toward some further discoveries.

As first, Upon the consideration of the congruity and incongruity of Bodies, as to touch, I found also the like congruity and incongruity (if I may so speak) as to the Transmitting of the *Raies* of *Light*: For as in this regard, *water* (not now to mention other *Liquors*) seems nearer of affinity to *Glass* then *Air*, and *Air* then *Quicksilver*: whence an oblique *Ray* out of *Glass*, will pass into *water* with very little refraction from the perpendicular, but none out of *Glass* into *Air*, excepting a direct, will pass without a very great refraction from the perpendicular, nay any oblique *Ray* under thirty degrees, will not be admitted into the *Air* at all. And *Quicksilver* will neither admit oblique or direct, but reflects all; seeming, as to the transmitting of the *Raies* of *Light*, to be of a quite differing constitution, from that of *Air, Water, Glass, &c.* and to resemble most those opaque and strong reflecting bodies of *Metals*: So also as to the property of cohesion or congruity, *Water* seems to keep the same order, being more